

WHAT IS CLAIMED IS:

1. A magnetic thin film element comprising a magnetoresistive film comprising: a first magnetic layer comprising a perpendicular magnetization film; a second magnetic layer comprising a perpendicular magnetization film having a higher coercive force than that of said first magnetic layer; and a nonmagnetic layer interposed between said first magnetic layer and said second magnetic layer; wherein the resistance of said magnetoresistive film varies depending on whether or not the magnetic spins of said first magnetic layer and said second magnetic layer are in the same direction.

2. A magnetic thin film element according to Claim 1, wherein said nonmagnetic layer comprises a good conductor.

3. A magnetic thin film element according to Claim 1, wherein said nonmagnetic layer comprises an insulator.

4. A memory element comprising: a magnetic thin film element according to Claim 1; and at least one write line comprising a good conductor provided in the vicinity of a magnetoresistive film of said magnetic thin film element with an insulator there between.

5. A memory element according to Claim 4, wherein a plurality of write lines are provided on the sides of the magnetoresistive film.

6. A memory element according to Claim 4, wherein information is retained in response to the direction of the magnetic spin of said first magnetic layer, and the direction of the magnetic spin of said second magnetic layer is always maintained in the same direction.

7. A memory element according to Claim 4, wherein information is retained in response to the direction of the magnetic spin of said second magnetic layer.

8. A magnetic thin film memory comprising: a plurality of memory elements according to Claim 4, being arrayed in a matrix on a substrate; wherein a magnetoresistive film of each of said memory elements is electrically connected to a semiconductor device comprising one of a field effect transistor and a diode.

9. A method for recording using a memory element according to Claim 6, comprising the steps of: applying an electric current to said write line; fixing a direction of the magnetic spin of said first magnetic layer by a magnetic field generated by the electric current; and recording a memory in a state of one of "0" and "1" by changing the direction of an electric current to be applied to said write line.

10. A method for reproducing using a memory element according to Claim 6, comprising the step of: detecting resistance of said magnetoresistive film to reproduce information recorded as the direction of the magnetic spin in said first magnetic layer.

11. A method for recording using a memory element according to Claim 7, comprising the steps of: applying an electric current to said write line; fixing a direction of the magnetic spin of said second magnetic layer by a magnetic field generated by the electric current; and recording a memory in a state of one of "0" and "1" by changing the direction of an electric current to be applied to said write line.

12. A method for reproducing using a memory element according to Claim 7, comprising the steps of: applying an electric current to said write line; and using a change in resistance resulting from the reversal of the magnetic spin of said first magnetic layer caused by a magnetic field generated by the electric current to reproduce information recorded in said second magnetic layer.